

Town of Danvers, MA

Smart Grid Implementation Program

Abstract

The Town of Danvers' Smart Grid Implementation Program includes advanced metering infrastructure (AMI) and automated distribution equipment. Smart meters and AMI for Danvers' residential, commercial, and industrial customers support time-based rate programs and a home energy network pilot. AMI is aimed at helping customers manage their energy usage, and Danvers hopes to reduce meter reading costs and air pollution by reducing truck rolls for meter reading. Benefits from distribution automation include better reliability and lower line losses.

Smart Grid Features

Communications Infrastructure includes systems for collecting, storing, and processing interval load data smart meters including meter data management and customer information systems. The AMI and distribution management system both use a 3.65-GHz Wi-Max radio system. Data from distribution automation equipment are processed by Energy Management Software, new distribution management systems, and upgraded supervisory control and data acquisition (SCADA) systems. Plans include full integration of all of the communications systems and components.

Advanced metering infrastructure includes installation of smart meters for all 12,839 electric customers in the Town of Danvers service territory. These meters record electricity consumption in precise intervals of an hour or less and provide more accurate metering and greater capabilities for time-based rate programs. The metered data are available to customers through a new Web portal and in-home displays. More precise tracking of consumption enhances distribution planning and improves load forecasting. Remote reporting capabilities reduce the need for truck rolls for meter reading, which reduces operating costs and air pollution.

Advanced electricity service options include the deployment of a Web portal, in-home displays, and home area networks. The Web portal and in-home displays provide two options for customers to track their consumption data from new smart meters, enhancing customer awareness of their usage patterns. A pilot program of 75 home area networks is being deployed, which provides customers with capabilities for automatically reducing their electricity usage based on time-based electricity

At-A-Glance

Recipient: Town of Danvers

State: Massachusetts

NERC Region: Northeast Power Coordinating Council

Total Budget: \$16,953,600

Federal Share: \$8,476,800

Project Type: Integrated and/or Crosscutting Systems

Equipment

- 12,839 Smart Meters
- AMI Communications Systems
- 75 Home Area Networks
- Customer Web Portal
- In-Home Displays
- Distribution Automation Upgrades for 5 of 34 Circuits
 - Distribution Management System
 - Distribution Automation Communications Network
 - SCADA Communications Network
 - Automated Distribution Circuit Switches
 - Smart Relays
 - Automated Capacitors

Time-Based Rate Programs

- Time-of-Use Pricing
- Critical Peak Pricing
- Peak-Time Rebates
- Variable Peak Pricing

Key Targeted Benefits

- Reduced Customer Electricity Costs
- Reduced Costs from Equipment Failures and Distribution Line Losses
- Reduced Operations and Maintenance Costs
- Enhanced Distribution Reliability and Power Quality
- Reduced Meter Reading Costs
- Reduced Truck Fleet Fuel Usage
- Reduced Greenhouse Gas Emissions

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rates. These new service options enable two-way information exchange between customers and the utility, allowing for better customer control of their electricity use and costs, while reducing the operating costs and peak demand. A net metering program is being deployed, which provides incentives for customers to install and use distributed energy resources.

Time-based rate programs being considered include time-of-use pricing, critical peak pricing, variable peak pricing, and peak-time rebates. These pricing programs are targeted to reduce peak demand by providing financial incentives to customers to reduce peak demand or shift consumption from on- to off-peak periods. Peak demand reductions reduce operation of peaking power plants, and reduce any associated greenhouse gas emissions of these plants. Customers participating in time-based rate programs have the ability to better manage their consumption and costs.

Distribution automation systems include the installation and/or retrofit of switches, re-closers, capacitor banks, and substation data concentrators. This equipment contains new capabilities to automatically monitor, analyze, and manage the distribution grid. The 23 kV backbone circuits of the local distribution grid are receiving the new automation equipment. Distribution automation equipment provides more rapid and effective response to power disturbances and can improve the reliability and quality of delivered power. Improvements in power quality are accomplished through better voltage control and management of reactive power and results in reductions in lines losses from inefficient voltage regulation. Along with improved system reliability and power quality, automation systems are being deployed as a means to reduced costs and emissions from grid operations, maintenance, and equipment failures.

Timeline

Key Milestones	Target Dates
AMI installation completed	Q3 2013
Distribution automation completed	Q2 2014
Customer systems implementation completed	Q2 2014

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